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Spring 1983 Conference Issue

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TURF BULLETIN

MASSACHUSETTS TURF AND LAWN GRASS COUNCIL
INCORPORATED

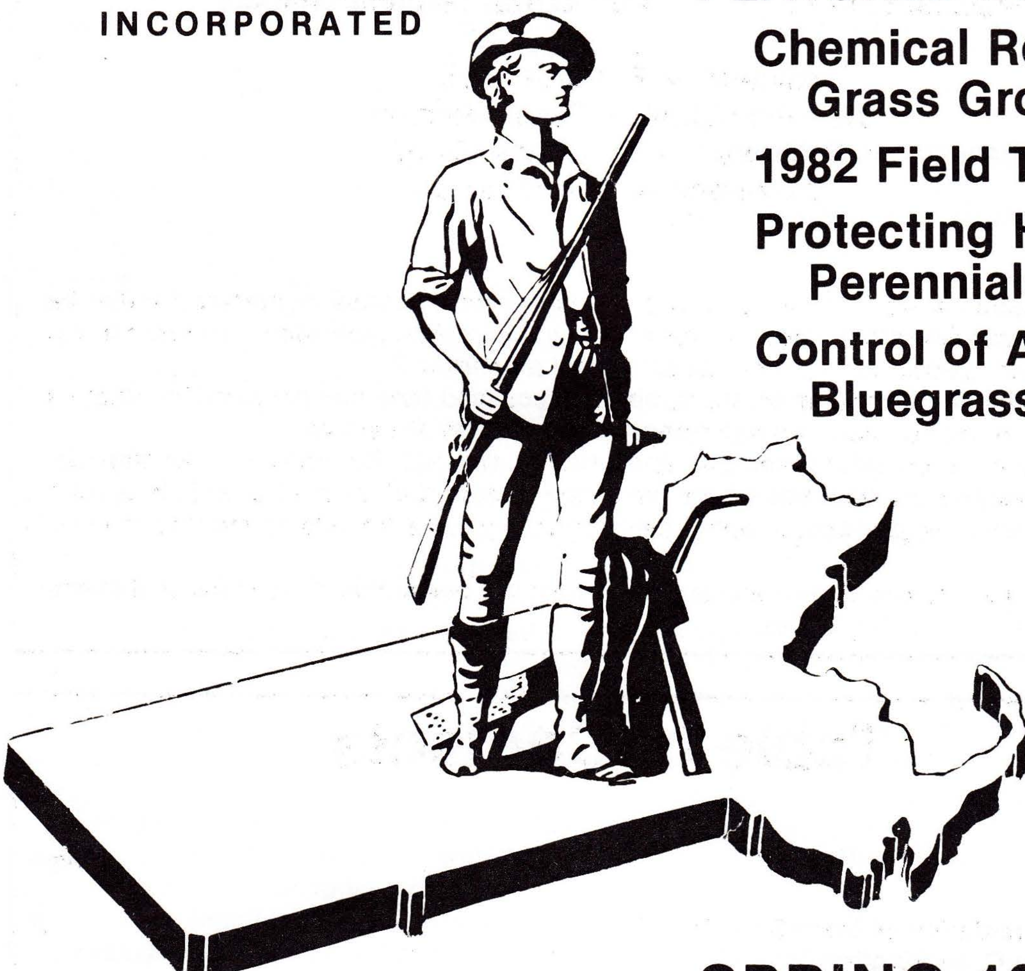
FEATURED IN THIS ISSUE:

Chemical Retardation of Grass Growth

1982 Field Trial Results

Protecting Herbaceous Perennials

Control of Annual Bluegrass



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BETTER TURF THROUGH RESEARCH AND EDUCATION

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The Massachusetts Turf and Lawn Grass Council Incorporated is chartered under the laws of the Commonwealth of Massachusetts as a non-profit corporation. The turf council seeks to foster "Better turf through research and education."

More detailed information on the subjects discussed here can be found in bulletins and circulars or may be had through correspondence with the editor.

The Editor wishes to thank Loretta J. Cassel for her research and technical assistance in the construction of this bulletin.

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Chemical Retardation of Grass Growth

Anna G. Symington
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The high cost involved in maintenance procedures of highway roadbanks, athletic fields, and many other non-agricultural areas is largely contributed to by the frequent mowings required of these areas. Some cool-season turfgrasses may require two or more mowings during spring just to remove unsightly seedheads that grow above the turf canopy.

Growth control of grass has been achieved on a limited scale by the use of chemical growth retardants. Growth retardants currently available for turfgrass use are maleic hydrazide (MH) and mefluidide (Embark). Erractic results have been obtained with MH, and is therefore not used widely. Mefluidide suppresses growth and seedhead production of turf but is presently used on low maintenance sites where high quality turf is not a top priority.

The drawback to mefluidide as with other experimental growth retardants that have recently been developed is the leaf injury associated with application of these chemicals. The injury first appears as a chlorosis of leaf tips which progresses down the leaf margins. The injury is present on the older leaves of the grass plant. The result is a yellow-colored turf that persists as long as the chemical remains active.

Research studies were undertaken to investigate the effects of some of the experimental growth retardants (MBR-18337, EL-500, PP-333) on 'Merion' Kentucky bluegrass growth and development both in the field and under environmentally controlled conditions. We also studied the role of water and temperature stress in the development of leaf injury.

Field studies were initiated in the spring of 1981 and 1982 to evaluate the performance of these experimental growth retardants at various rates and combinations, comparing them to untreated controls, both mowed and unmowed (Table 1).

The field studies were located at the University of Massachusetts Experimental Turf Plots in South Deerfield, Massachusetts. The grass was maintained at a cutting height of two inches prior to growth retardant application. Ten days following chemical treatment, the turf plots were mowed again at a two-inch cutting height to remove any seedhead culms that may have been initiated before treatment. Control plots were mowed weekly at a two-inch cutting height, while unmowed controls were not mowed throughout the duration of the studies.

To determine the influence of environmental stress on turf injury from growth retardant treatment, potted Kentucky bluegrass plants were grown and treated in temperature controlled growth chambers. Temperature and/or water stress was induced one week after chemical treatment by increasing the chamber temperature from 21°C to 30°C and/or watering plants only upon signs of visual wilt.

Research data confirmed mefluidide's ability to retard growth and indicated that all the experimental growth retardants studied were capable of retarding turf growth as compared to uncut controls. Plants treated with mefluidide or MBR-18337 showed a 20% reduction in shoot height by two weeks after application. EL-500 and PP-333 were slower acting but maintained significant height reductions up to termination of the studies. EL-500 and PP-333 had shoot reductions of 46% and 56%, respectively, at the termination of the experiments while the retarding abilities of mefluidide and MBR-18337 had diminished. Combination treatments at the high rates of EL-500 or PP-333 with mefluidide showed significant height reductions even upon termination of the studies.

A desirable characteristic of a growth retardant is the ability to inhibit seedhead formation. Mefluidide and MBR-18337 suppressed seedhead formation and were comparable to mowed controls. EL-500 and PP-333 did not suppress seedheads, comparable to unmowed controls. EL-500 and PP-333 in combination with mefluidide suppressed seedhead production.

The 1981 field study indicated that all growth retardants caused leaf injury to turf. Leaf injury was evident 3-4 weeks after chemical application. Injurious effects of mefluidide and MBR-18337 lasted approximately 2-3 weeks whereas the injurious effects of EL-500 and PP-333 were more severe and still evident upon termination of all the studies, causing an objectionable and unacceptable turf appearance.

The environmentally controlled stress studies indicated that temperature stress enhanced leaf injury caused by growth retardants. This could explain the observed low quality of turf in the 1981 field study following a warm period (30°C or above) the third week after chemical application. The enhancement of leaf injury as a result of temperature stress is further supported by the 1982 field study. Although turf quality was reduced as a result of leaf injury from growth retardant treatment, the injury did not appear as severe nor last as long as compared to the 1981 field study. The diminished severity of leaf injury could be attributable to the fact that the summer of 1982 was cooler than the summer of 1981.

Although these studies have shown that high temperatures appear to be responsible for increasing the degree of leaf injury caused by growth retardant treatments, this in no way precludes the fact that objectionable leaf injury results directly from the application of growth retardants. The implications of these results are important in terms of maintenance of fine turf where top quality appearance is of high priority. For effective use, growth retardants must be developed which retard turf growth and suppress seedhead production without adversely affecting turf appearance.

table 1. Growth retardant rates and combinations for field studies.

Chemical Treatment	Rate LBS a.i./A
EL-500 (50W)	0.75, 1.00*, 1.50
PP-333 (50W)	2.00*, 3.00, 4.00
MBR-18337 (2E)	0.12, 0.25, 0.50
Mefluidide (2S)	0.38*
EL-500 + mefluidide	0.75 + 0.06, 0.75 + 0.12
	1.00 + 0.06, 1.00 + 0.12
PP-333 + mefluidide	0.25 + 0.06, 0.25 + 0.12
	0.50 + 0.06, 0.50 + 0.12

*Chemical rates used for environmentally controlled studies.

Cultivar Trials - 1982

Mickey Spokas and Dr. Joseph Troll
University of Massachusetts/Amherst

Plant breeders introduce an increasing number of cultivars each year. Tests are conducted to provide data on the performance of these cultivars under varying environmental conditions and maintenance practices. The results of these trials are published to aid turf specialists in the selection of cultivars which are best suited to the specific needs of a given situation. They are not to be considered as a recommendation for a specific cultivar.

Perennial Ryegrass Trial

A perennial ryegrass cultivar trial was initiated at the University of Massachusetts turfgrass research station on Sept. 20, 1979. Forty-two cultivars were planted in 4 ft. by 6 ft. plots, with each cultivar replicated three times. The stand was mowed twice weekly at a height of 1½ inches. Initial fertilization was at a rate of 3 lbs. actual nitrogen per 1000 sq. ft. per year. Last year (1982), fertilization was reduced to 2 lbs. actual nitrogen per 1000 sq. ft. per season. The change in fertility levels was made in order to observe the possible effects of lower maintenance on the cultivars.

Good germination of all seed varieties was obtained in the fall of 1979, but many cultivars did not overwinter well. All but two, NK-200 and Pelo, required reseeding in the spring of 1980.

Quality ratings based on color and density were taken monthly throughout the growing season. K5-684, Prelude, and Elka were the cultivars which rated consistently high. Winterkill was evident in the spring of 1981; the cultivars most severely affected were Barry, Diplomat, Yorktown, CT-112, Pelo and Dasher. Cultivars Prelude and K5-684 rated highest throughout 1981, while Loretta was found to do well in the spring only, and Pennfine rated high in July and August. Winterkill was not evident in the spring of 1982, although the entire trial was apparently severely stressed, as evidenced by the low quality rating in May 1982 (see table 1). An infestation of red thread (Corticium fuciform) which appeared in early June 1982 was left untreated so that any cultivars exhibiting natural tolerance would be evident. Mom LP 20, Yorktown, Yorktown II, Loretta, RFK and Citation were least resistant to the infestation, while Derby exhibited the most tolerance. Cultivars which maintained consistently higher quality ratings were Blazer, K5-684 and Prelude.

Kentucky Bluegrass Trial

Eighty-four Kentucky bluegrass cultivars were seeded in 4 ft. by 6 ft. plots, each replicated three times, on Sept. 24, 1980. The grass received 2 lbs. of actual nitrogen per 1000 sq. ft. and was mowed twice weekly to a height of 1½ inches. Cultivars did not receive any supplemental water, and to facilitate disease observations, fungicides were not applied. Cultivars Kimono, Dormie, WW Ag 4781 and A20 consistently rated high. (See table 2.) Cultivars BA-61-91, 225, Mystic, Admiral, Eclipse, Escort, K3-179, K3-178, K1-152 and Barblue appeared to be free of leaf spot.

Table 1. Performance of perennial ryegrass cultivars - 1980-1982.

Cultivar	1982						Red thread infection-1982			
	5/3	6/8	7/1	8/5	9/24	Avg.	6/15	7/1	8/5	9/24
Barry	1.7[1]	3.0	3.3	3.0	4.3	3.1	2.6[2]	1.3	0.3	0.3
Diplomat	2.3	4.0	4.0	4.0	5.0	3.9	2.0	1.6	0.6	- -
Yorktown	2.7	3.3	3.3	2.7	3.3	3.1	2.3	2.3	0.6	0.3
Yorktown II	3.0	3.7	4.7	3.3	4.3	3.8	0.6	1.6	1.0	0.6
K5-684	1.7	4.3	4.3	4.0	5.3	3.9	1.3	1.6	0.3	0.3
Eton	2.7	3.3	4.0	3.0	4.3	3.5	1.0	1.6	0.6	0.6
K5-88	2.7	3.3	4.0	4.0	5.3	3.9	1.3	2.0	0.3	- -
K5-683	3.0	3.7	3.7	3.7	3.3	3.5	2.0	1.6	0.3	0.3
NK-200	2.3	4.0	4.0	3.0	3.3	3.3	0.6	0.3	0.3	- -
Goalie (K5-92)	2.3	3.0	3.7	3.0	4.0	3.2	0.3	- -	0.3	0.3
Svea (K4-102)	2.0	3.3	3.7	3.0	3.3	3.1	1.3	1.0	0.3	0.6
Delray (K5-90)	2.3	4.0	4.0	4.0	4.7	3.8	0.3	0.6	0.3	0.3
CT-112	2.7	3.7	4.3	3.7	5.0	3.9	0.6	1.3	0.6	- -
Derby	1.7	3.3	3.7	3.3	4.0	3.2	- -	- -	- -	0.6
Paramount	2.0	3.0	3.0	3.0	3.7	2.9	0.3	2.0	0.3	0.3
Mom LP 20	2.3	3.3	4.3	3.7	4.3	3.6	2.0	2.0	1.0	- -
Mom LP 617	2.3	3.0	3.0	2.7	3.7	2.9	2.0	1.0	0.3	0.3
RFK	2.7	4.3	4.7	3.7	4.0	3.9	1.0	2.0	1.0	0.3
Princess	2.3	3.3	3.3	3.3	4.3	3.3	0.6	1.0	0.6	0.3
Loretta	2.3	3.3	4.0	3.0	5.0	3.5	1.6	2.0	1.0	0.3
Caravelle	1.3	2.7	3.0	2.7	3.3	2.6	1.0	1.6	0.6	- -
Sprinter	2.0	3.3	3.7	3.3	3.7	3.2	1.6	1.0	- -	0.6
Score	1.3	4.0	4.0	3.4	4.7	3.5	0.6	1.3	0.6	- -
ZW 42-80	1.7	3.7	3.3	3.7	4.0	3.3	1.3	1.0	0.3	0.3
Springfield	1.7	4.3	4.0	3.0	4.0	3.4	0.3	1.3	0.6	- -
Pelo	2.0	2.7	3.7	3.3	3.3	3.0	0.6	1.0	0.3	0.3
Arno	2.0	3.0	3.7	3.7	4.0	3.3	0.3	1.3	0.3	0.6
R-36	2.3	2.7	3.0	3.0	3.3	2.9	1.6	1.3	0.3	0.3
FRR-1	2.7	4.0	4.3	3.3	4.7	3.8	1.0	1.3	0.6	0.3
Prelude	2.7	4.3	4.3	4.3	5.3	4.2	1.3	2.0	0.6	0.3
Belle (MP-1)	2.7	3.3	4.0	3.0	4.7	3.5	0.3	1.0	0.3	0.6
Manhattan	2.7	4.0	4.7	4.0	4.3	3.9	1.0	1.0	0.6	0.3
Pennfine	2.3	4.0	4.3	3.7	5.3	3.9	0.6	1.0	0.6	- -
Norlea	3.0	3.3	3.3	2.7	3.0	3.1	0.6	1.0	- -	0.3
Citation	2.0	3.0	3.3	3.3	3.7	3.1	0.6	2.0	- -	1.0
Acclaim	2.7	3.3	4.0	4.0	4.3	3.7	0.3	0.3	0.3	0.3
Blazer	2.7	5.0	5.0	4.7	5.3	4.5	1.0	1.0	0.6	- -
Dasher	1.7	3.3	3.3	3.7	3.3	3.1	0.6	1.6	- -	- -
Manhattan & Pennfine	2.3	3.3	4.0	3.3	3.3	3.3	0.6	1.0	- -	0.6
Fiesta	2.3	3.7	4.3	4.0	4.3	3.7	- -	1.0	0.3	0.3
Elka	2.7	3.0	3.3	2.3	2.7	2.8	1.0	0.6	- -	0.3
Derby & Manhattan	2.3	3.3	3.7	3.7	3.7	3.3	0.3	0.6	0.3	- -

[1]Quality ratings were based on color and density on a scale of 1 - 9, with 9 = ideal turf and 1 = no turf.

[2]Red thread infection ratings were based on a scale of 1 - 3, with 3 = severe infection, 2 = moderate infection, and 1 = slight infection.

Table 1. Performance of perennial ryegrass cultivars - 1980-1982.

Cultivar	1980						1981				
	6/5	7/8	8/5	9/4	10/14	Avg.	5/27	6/23	7/10	8/10	Avg.
Barry	6.3[1]	6.0	5.3	3.7	6.0	5.5	3.7[1]	3.3	3.7	3.3	3.5
Diplomat	5.3	6.0	5.0	4.7	5.3	5.3	3.3	4.0	4.3	4.3	4.0
Yorktown	5.0	6.0	5.0	5.0	6.0	5.4	4.3	3.3	4.0	3.7	3.8
Yorktown II	5.3	5.3	5.7	5.3	7.0	5.7	4.0	4.3	4.7	4.7	4.4
K5-684	5.7	7.0	5.7	5.7	6.3	6.0	5.3	4.7	5.0	5.0	5.0
Eton	5.0	5.7	4.3	3.7	5.0	4.7	5.0	4.0	4.3	3.7	4.3
K5-88	2.7	4.7	4.3	3.7	5.7	4.2	4.7	3.7	5.3	4.3	4.5
K5-683	5.0	5.7	4.7	5.0	6.3	5.3	3.7	2.7	3.7	4.0	3.5
NK-200	6.0	5.7	4.7	3.0	4.3	4.7	3.0	4.7	3.7	3.3	3.7
Goalie (K5-92)	3.7	4.7	5.0	3.7	5.0	4.4	4.3	3.0	3.7	4.0	3.8
Svea (K4-102)	5.0	5.0	4.3	3.7	4.3	4.5	3.7	3.0	4.0	3.3	3.5
Delray (K5-90)	5.3	5.7	4.7	4.7	5.3	5.1	5.3	4.0	4.7	4.3	4.6
CT-112	3.7	5.0	4.7	5.0	6.0	4.9	4.0	3.3	4.3	4.0	3.9
Derby	3.7	4.7	4.7	5.0	5.0	4.6	2.3	2.7	4.0	3.3	3.1
Paramount	4.7	4.3	3.0	3.0	4.3	3.9	4.3	3.0	2.7	2.7	3.2
Mom LP 20	5.7	5.7	4.7	4.0	5.3	5.1	5.3	4.3	4.0	4.7	4.6
Mom LP 617	5.3	6.3	5.7	5.0	5.0	5.5	3.0	2.7	2.7	3.7	3.0
RFK	5.0	5.3	5.0	4.7	6.0	5.2	4.7	3.7	4.3	4.3	4.3
Princess	4.7	5.3	4.3	4.0	5.3	4.7	4.3	3.7	3.7	4.0	3.9
Loretta	5.3	5.3	4.7	5.3	7.0	5.5	5.3	5.0	4.7	4.3	4.8
Caravelle	3.3	3.7	4.7	3.7	4.0	3.9	3.3	2.3	2.3	3.0	2.7
Sprinter	4.7	5.3	5.0	3.3	4.0	4.5	4.7	3.7	4.3	4.0	4.2
Score	5.0	4.7	4.3	3.7	4.7	4.5	3.0	3.3	3.3	3.3	3.2
ZW 42-80	4.7	5.7	4.7	3.3	4.7	4.6	3.3	3.7	4.0	3.7	3.7
Springfield	4.7	5.3	5.0	3.3	4.3	4.5	4.3	3.7	4.0	3.3	3.8
Pelo	6.0	6.7	5.3	3.3	4.0	5.1	4.7	3.3	4.0	3.0	3.8
Arno	5.7	6.3	5.0	3.7	4.7	5.1	4.0	3.7	4.3	4.3	4.1
R-36	4.0	6.3	5.3	5.7	7.0	5.7	3.0	3.0	3.7	4.0	3.4
FRR-1	4.7	5.3	5.3	5.0	6.7	5.6	4.0	4.0	4.7	4.3	4.3
Prelude	5.3	6.7	5.7	6.3	7.0	6.2	5.3	4.7	5.7	5.0	5.2
Belle (MP-1)	5.0	6.0	5.0	6.0	6.7	5.7	5.0	4.0	5.0	4.7	4.7
Manhattan	5.7	6.7	6.0	4.3	6.3	5.8	3.3	4.0	4.3	4.3	4.0
Pennfine	4.3	6.0	4.7	4.7	6.3	5.2	4.0	3.3	5.0	4.7	4.3
Norlea	4.3	5.0	4.7	3.0	4.0	4.2	4.7	3.3	4.3	3.3	3.9
Citation	3.7	5.7	4.7	4.7	7.0	5.2	3.3	3.3	4.3	3.3	3.6
Acclaim	4.3	5.3	4.7	3.7	5.3	4.7	4.0	3.3	4.0	4.3	3.9
Blazer	5.3	5.3	5.7	4.7	6.3	5.5	4.7	5.3	5.0	4.0	4.6
Dasher	5.0	5.3	5.3	5.3	6.7	5.5	3.3	3.3	4.0	3.3	3.5
Manhattan & Pennfine	5.0	6.7	5.3	5.0	6.0	5.6	3.7	3.3	5.3	4.3	4.2
Fiesta	5.3	5.7	5.3	6.7	7.3	6.1	3.7	3.3	4.0	3.7	3.7
Elka	6.3	6.7	5.7	5.0	6.7	6.1	3.3	4.0	4.0	4.0	3.8
Derby & Manhattan	5.3	6.7	5.3	5.3	6.3	5.8	4.7	4.3	4.7	4.3	4.5

[1]Quality ratings were based on color and density on a scale of 1 - 9, with 9 = ideal turf and 1 = no turf.

Red thread infection ratings were based on a scale of 1 - 3, with 3 = severe infection, 2 = moderate infection, and 1 = slight infection.

Table 2. Performance of Kentucky bluegrass cultivars - 1982.

Cultivar	5/3	6/3	7/1	8/10	9/24	10/28	Avg.
Adelphi	1.6*	2.3[1]	2.6	3.0	2.6	3.3	2.6
Glade	2.6	2.6[1]	4.0	4.6	4.3	4.6	3.8
Birka	2.6	4.3[1]	4.6	5.3	4.3	4.0	4.2
Monopoly	2.6	3.0[1]	3.0	4.0[2]	4.3	4.3	3.5
Ram-I	2.6	4.0[1]	3.6	4.6	4.6	4.3	4.0
Fylking	2.3	3.6[1]	4.6	4.0	3.6	4.3	3.7
Cheri	2.6	4.0[1]	4.6	3.6[2]	3.3[2]	4.0	3.7
243	2.3	2.5[1]	3.6	3.6	3.3	4.0	3.2
Wabash	2.6	2.6[1]	2.3	4.0	4.3	4.0	3.3
Nugget	1.3	3.0[1]	3.6	4.3[2]	4.0[2]	3.6	3.3
239	2.3	2.6[1]	3.6	4.0	3.6	3.3	3.2
S-21	3.0	3.0[1]	2.3	2.3	3.0	3.6	2.9
PSU-190	3.0	3.5[1]	5.3	4.6[2]	4.3	4.6	4.2
PSU-150	3.3	3.0[1]	4.0	4.3	4.0	4.3	3.8
PSU-173	2.3	2.6[1]	4.3	5.0	4.3	4.3	3.8
Kimono	2.3	4.0[1]	5.0	4.6[2]	4.6	4.6	4.2
Baron	2.0	3.6[1]	4.3	5.3[2]	4.3	4.3	4.0
Enmundi	2.3	3.0[1]	4.3	5.0[2]	4.6	4.0	3.7
Plush	2.0	3.0[1]	3.0	4.0[2]	4.0	3.6	3.3
Parade	2.0	2.3[1]	3.3	4.0	4.3	3.3	3.2
Trenton	2.0	3.3[1]	4.0	4.0	4.6	4.3	3.7
Rugby	2.3	3.0[1]	3.3	3.3	3.6	4.0	3.3
SU-01617	2.0	2.3[1]	4.0	4.6	4.0	5.0	3.7
Banff	2.6	4.3[1]	4.6	3.6	3.3	4.0	3.7
Dormie	2.6	4.3[1]	5.3	5.0[2]	3.0	5.0	4.2
Holiday	2.0	2.3[1]	4.0	3.6	3.3	4.3	3.3
Geronimo	2.6	3.3[1]	4.3	5.3	4.3	4.6	4.0
Aspen	2.0	3.0[1]	3.6	4.0	3.3	3.6	3.3
MLM-18011	2.0	2.6[1]	3.6	5.0	4.3	4.3	3.6
CEB VB 3965	2.3	3.0[1]	4.3	5.0	5.0	4.6	4.0
Touchdown	2.3	2.6[1]	3.6	4.6[2]	4.6	3.6	3.6
Welcome	2.3	2.6[1]	3.3	4.6	4.0	4.3	3.5
WW Ag 463	2.0	3.0[1]	3.6	4.3	3.6	4.3	3.5
WW Ag 480	2.0	4.0[1]	4.3	5.0	4.3	3.3	3.8
Bono	2.3	4.0[1]	4.0	4.6	4.3	4.0	3.9
Kenblue	3.0	2.0[1]	2.0	3.0[2]	2.3	2.6	2.5
Harmony	2.0	2.6[1]	3.0	4.3	4.0	4.3	3.7
American	2.0	3.3[1]	4.0	4.6	4.3	4.6	3.7
Vanessa	2.6	3.3[1]	4.0	4.6	4.3	3.6	3.9
Mosa	2.6	3.6[1]	3.3	4.3[2]	4.3	4.0	3.7
Cello	2.6	3.0[1]	4.3	5.3[2]	4.6	3.6	3.3
Eclipse	1.6	3.0	3.3	4.0	4.0	3.3	3.2
WW Ag 478	1.6	4.6[1]	5.3	5.3[2]	5.0	4.0	3.7
Piedmont	3.0	2.3[1]	2.0	4.0	4.0	4.6	3.3
Majestic	2.3	3.0[1]	4.0	4.3[2]	3.6	4.6	3.6
Bonnieblue	2.3	3.3[1]	3.3	4.0	3.3	4.0	3.4
Vantage	2.3	2.0[1]	2.6	3.3	3.6	4.3	3.0
Merit	2.6	3.6[1]	4.3	4.6	4.6	5.0	4.1
Argyle	2.6	2.0[1]	2.3	3.0	3.0	3.3	2.7
Charlotte	2.0	3.0[1]	4.3	4.6[2]	4.0	4.3	3.7
A-20-6	2.3	3.3[1]	4.0	4.3	4.6	4.3	3.8
A20	2.3	4.0[1]	5.0	5.0[2]	4.6	4.3	4.2
H-7	2.0	3.6[1]	4.3	3.6	3.3	4.3	3.5
I-13	2.6	3.3[1]	4.0	4.6	4.6	4.0	3.9
A20-6A	1.6	2.6[1]	4.0	4.0	3.0	4.6	3.3
N535	2.3	3.3[1]	4.0	4.0	4.3	4.0	3.7
1528T	2.0	4.0[1]	4.3	4.0[2]	3.3[2]	3.6	3.5
Shasta	2.6	3.3[1]	3.6	4.3	4.6	4.6	3.8
Columbia	2.3	3.6[1]	4.0	4.3	3.3	4.0	3.6
Apart	3.0	3.3[1]	4.3	3.3	3.6	5.0	3.8
A-34	2.0	2.6[1]	3.3	4.0	3.3	4.3	3.3
Sydsport	2.6	3.3[1]	5.0	4.6[2]	4.3	5.0	4.2
Mer pp 300	2.3	3.0[1]	4.3	4.3	5.0	5.0	4.0
Mer pp 43	3.0	2.0[1]	3.3	4.0	3.6	4.0	3.3
Mona	2.3	3.6[1]	4.3	4.3	3.6	4.3	3.7
Lovegreen	2.0	3.0[1]	4.3	5.0	4.6	4.6	3.9
Bristol	2.3	2.6[1]	4.6	3.6[2]	3.0	4.0	3.4
Victa	2.6	4.0[1]	4.3	5.0	4.3	4.6	4.1
Enoble	2.3	4.0[1]	4.3	4.3	4.3	4.0	3.9
SH-2	3.0	3.6[1]	3.6	4.3	4.6	4.6	4.0
NJ 735	2.0	3.3[1]	4.3	4.0	3.6	3.3	3.4
S.D. Common	3.0	2.0[1]	2.0	2.3	2.6	3.6	2.6
Merion	2.3	2.6[1]	3.6	4.6	3.3	3.3	3.3
BA-61-91	2.6	3.6	4.6	5.0[2]	4.3	4.6	4.1
Bayside	3.0	2.6[1]	3.0	3.6	4.0	4.0	3.4
225	2.6	3.0	4.0	4.3	3.6	4.0	3.6
P141 (Mystic)	2.3	3.3	3.3	4.3[2]	4.0[2]	4.3	3.6
Admiral	2.3	2.6	4.3	3.3	3.3	4.0	3.3
Escort	2.6	3.0	4.6	4.3[2]	4.0	4.6	3.9
K3-162	3.0	3.3[1]	3.0	3.6	3.3	4.0	3.4
K3-179	1.6	3.6	2.0	3.0	2.6	4.0	2.8
K3-178	3.0	3.6	4.0	3.6	3.6	5.0	3.8
K1-152	2.0	2.6	3.3	3.0	2.6	4.0	2.9
Barblue	1.6	3.3	3.3	4.0	3.3	4.0	3.3

1 = Helminthosporium
2 = Dollar spot

* Quality ratings were based on color and density on a scale of 1 - 9, with 9 representing ideal turf and 1 no turf.

PROGRAM

52nd MASSACHUSETTS TURFGRASS CONFERENCE and 7th INDUSTRIAL SHOW

"Dedication to Mr. Alexander M. Radko"

for Outstanding Devotion and Service to the Turf Profession

March 1, 2, and 3, 1983 Civic Center Springfield, Massachusetts
(I-91, Exit 6 from South, Columbus Avenue Exit from North)

Sponsored by Department of Plant and Soil Sciences, University of Massachusetts/Amherst
Massachusetts Turf and Lawn Grass Council
Golf Course Superintendents Association of New England

PLEASE BRING THIS PROGRAM WITH YOU

REGISTRATION
Lobby, Plaza Entrance

8:30 AM- 4:00 PM Tuesday, March 1, 1983

8:00 AM- 4:00 PM Wednesday, March 2, 1983

TUESDAY, MARCH 1

—Morning—

9:00 AM-12:45 PM Industrial Show Open
Exhibition Hall, Snack Bar.

—Afternoon—

GENERAL SESSION
Banquet Room

Chairman: Dr. Joseph Troll
University of Massachusetts

1:00 **Welcome**
Dr. John Denison, Dean-
Stockbridge School
University of Massachusetts/Amherst

1:15 **Planning for an Interview Helps Give You the Edge**
Mr. Richard Bator, Supt.
Oak Hill Country Club
Rochester, NY

1:45 **Job Search Campaigning**
Mr. Dennis Collings, Owner/Manager,
Management Resume Service,
Springfield, MA

2:15 **The Superintendent's PR Program**
Mr. Cecil F. Kerr, Executive Sales,
Mallinckrodt, Inc., St. Louis, MO

3:00 PM- 3:15 PM Break

3:15 **Personnel Management on Golf Courses**
Mr. Paul Boizelle, Supt.,
Onwentsia Club, Lake Forest, IL

3:45 **Golf Course Budget and Salaries**
Mr. Anthony B. Caranci, Jr., Supt.,
Ledgemont Country Club
Seekonk, MA

4:30 PM- 6:30 PM Industrial Show Open
Exhibition Hall

WEDNESDAY, MARCH 2

GOLF COURSE SESSION
Banquet Room

—Morning—

Chairman: Prof. John M. Zak
University of Massachusetts

9:00 **Cost Considerations and Equipment Acquisition**
Dr. James R. Watson, Vice Pres.,
Toro Co., Minneapolis, MN

9:45 **Syringing of Bentgrass Golf Greens**
Dr. Joseph DiPaola, Dept. of Crop Science, North Carolina State University,
Raleigh, NC

10:30 **Coloring the Course**
Ms. Ann Reilly, Exec. Director,
State Turfgrass Association
Massapequa Park, NY

11:00 AM-2:00 PM **Industrial Show Open**
Exhibition Hall

—Afternoon—

2:00 **Nitrogen Leaching**
Mr. Charles Mancino,
Dept. of Plant and Soil Sciences
University of Massachusetts/Amherst

2:30 **Fertility Strategies and Stress Tolerances**
Dr. James Beard,
Dept. of Soils and Crop Sciences
Texas A & M University,
College Station, TX

3:00 **Concept of Stadium Golf**
Mr. Allan MacCurrach, Agronomist,
Tournament Players Club,
Sawgrass, Ponte Vedra, FL

3:45 **Short Seasons and Low Budgets**
Dr. Vaughn Holyoke
Dept. of Plant and Soil Sciences
University of Maine, Orono, ME

4:30 PM- 6:30 PM **Industrial Show Open**
Exhibition Hall

—Evening—

7:00 **Banquet and Winter School Ceremony**
"Never Met a Golf Course I Didn't Like"
Dr. Houston B. Couch, Virginia
Polytechnic Institute & State University
Blacksburg, VA

WEDNESDAY, MARCH 2

ALTERNATE SESSION
College Room

—Morning—

Chairman: Mr. Charles Mruk, Agronomist
B.F.C. Chemicals, Inc., Providence, RI

9:00 **People Versus Plants**
Mr. Robert Partyka, Director of Horticulture
ChemScape Corp., Worthington, OH

9:30 **Easy Answer to Tree Problems via Systemic Treatments**
Mr. Warren D. Wolfe, President,
Creative Sales, Inc., Fremont, NE

10:00 **Hanging Baskets - Fertilizer, Water and Soil**
Mr. James Crow, Ass't Director
U.S. Botanical Gardens,Washington, DC

10:30 **Maintenance Planning for Cemeteries**
Mr. Donald Ward, President/Landscape
Architect, Grener & Ward,
Orchard Park, NY

11:00 AM-2:00 PM **Industrial Show Open**
Exhibition Hall

—Afternoon—

2:00 **Selection of Turfgrass Species and Cultivators to Minimize Problems**
Mr. Richard Hurley, Research & Agronomy,
Lofts Seed Inc., Bound Brook, NJ

2:45 **Building of Athletic Fields for the Kansas City Chiefs**
Mr. Chip Toma, Groundskeeper,
Kansas City Royals Baseball Club,
Kansas City, MO

3:30 **Another Man's Turf**
Mr. George Toma, Stadium Supt.,
Kansas City Royals Baseball Club,
Kansas City, MO

4:30 PM- 6:30 PM **Industrial Show Open**
Exhibition Hall

THURSDAY, MARCH 3

9:00 PM-10:00 PM **Industrial Show Open**
Exhibition Hall

GOLF COURSE SESSION
Banquet Room

—Morning—

Chairman: Dr. William A. Torello
University of Massachusetts

10:00 **Pine Valley Golf Course**
Mr. E. R. Steiniger, Supt.,
Pine Valley Golf Course,
Pine Valley, NJ

10:30 **Amounts to Use When Applying Fungicides**
Dr. Houston B. Couch,
Dept. of Plant Pathology & Physiology,
Virginia Polytechnic Institute & State
University, Blacksburg, VA

11:00 **New Cultural Trends in Golf Course Management**
Dr. James Beard,
Dept. of Soil & Crop Science,
Texas A & M University,
College Station, TX

11:30 **Issues and Answers**
Mr. James Snow, Director
Northeast Region, USGA Green Section
Far Hills, NJ

Dollar Spot Fungicide Control Trials - 1982

Dr. Joseph Troll
University of Massachuusetts/Amherst

For most of the 1982 season, the weather in Western Massachusetts favored turfgrass growth. June was a wet month; seven and seven-tenths inches of rain were recorded on the University of Massachusetts South Deefield turf plots. And yet June temperatures did not seem to enhance leaf spot infection of Kentucky bluegrass. In fact incidence of turfgrass diseases remained low for the entire season. Dollar spot appeared on both Kentucky bluegrass and bentgrass in July, but a more severe infection was noted in late August. Cool moist weather fostered an increase of red thread on most cultivars of perennial ryegrass growing in the University of Massachusetts plots. October and November weather favored a rather high amount of pink snow mold infecting both annual bluegrass and bentgrass on the Amherst, Massachusetts Golf Course.

The efficiency of several fungicides *per se* and a few in combination with other fungicides were again tested for the control of dollar spot, *Sclerotinia homeocarpa.* A few chemicals were applied at several rates and intervals to determine their significant effects on the control of the disease.

The trial site consisted of PennCross creeping bentgrass growing in a silt loam located on the University of Massachusetts South Deerfield Turfgrass Research Station. The turfgrass area was mowed three times weekly at 0.25 inches. One and one-half pounds of nitrogen per 1000 sq. ft. were applied during the season. Plot size was 5 ft. by 5 ft. with three replications. Fungicides were applied on July 7 and 29, August 5 and 27, and September 15 and 29. One set of plots that received Chipco 26019 at 30-day intervals was sprayed on July 14, August 5, and September 5. Fungicides were applied with a 1-liter CO_2 powered sprayer. Results are shown in Table 1.

All fungicides tested controlled dollar spot. One plot of three to which Daconil 2787 was applied at the 3-oz. rate was somewhat heavily infected with the dollar spot organism. An explanation of why one site was more severely infected than the other two remains unanswerable.

Table 1. Fungicides, rates of application and average percent of dollar spot - 1982.

Fungicide	Rate	Average % Disease						
	oz/1000 ft^2	7/13	7/27	8/10	8/27	9/13	9/29	10/12
Daconil 2787	3.0	3.0	6.0	4.0	3.6	1.6	12.6	10.0
Daconil 2787	6.0	1.0	0.3	1.0	0.0	0.0	0.3	0.0
Scott's	21.0	0.3	0.6	0.3	0.0	0.0	0.3	0.0
Chipco 26019	1.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Chipco 26019*	1.5	1.3	0.0	0.6	0.0	0.0	1.3	0.0
TFG & Bayleton	1.0&1.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
TGF & Daconil	1.0&1.0	1.0	0.6	0.6	0.0	0.0	0.0	0.0
TGF	2.0	2.3	0.3	0.0	0.0	0.0	0.0	0.0
Bayleton	1.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0
Douson	3.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Vorlan	2.0	1.0	0.0	0.3	0.0	0.0	0.0	0.0
Control	—	2.3	3.3	3.6	12.3	16.6	35.0	23.0

*Applied every 30 days.

Winter Protection of Herbaceous Perennials

Nancy L. Garrabrants
Instructor, Department of Plant and Soil Sciences

It is not too late to apply winter mulch on your fall planted or established herbaceous perennial gardens. The majority of winter kill occurs in early winter and in early spring when there is no snow coverage. Snow is a natural insulator to the plant crowns and helps keep the temperature around roots and crowns constant. With the lack of a mulch covering and snow cover, the soil alternately freezes and thaws damaging roots and exposed crowns, increasing the likelihood of winter injury.

Fall is the ideal time for garden cleanup and application of winter mulches. Before applying a mulch, remove and burn all dead top growth eliminating insect and diseases overwintering. Leave stem stubs 3 to 5 inches high from the base of the crown to hold the snow and mulches around the plant base. Apply winter mulch once the ground has a frozen crust of 2″ or more.

Many types of winter mulches are available. Mulch that compacts (grass clippings, sawdust, pine needles, peat moss and norway maple leaves) will decrease air circulation increasing the likelihood of crown rot. This type of mulch can be used between plants but not placed directly on the crowns. Preferred winter mulches to use are straw, march hay, certain leaf species and evergreen boughs. Apply mulches to a depth of 4 to 6 inches, the coarser the mulch the thicker the depth applied. Leaves (oak, birch, hardwood maples) to use are those which curl when they fall from trees because the leaves do not compact. Evergreen boughs provide excellent winter protection. The boughs provide attractive coverage and may be the best choice for those areas around the club house. Mulches may fly off if your garden is exposed to continuous wind. In this case anchor down the mulch using evergreen boughs or chicken wire weighted down with bricks or stones.

Special winter protection is necessary for roses planted in Zone 3 to 5. Mulch roses once the ground is frozen (2″) to avoid rodents nesting in the winter protection. For hybrid teas, floribunda and other bush types, pile soil 8-10 inches high around canes. Do not remove soil from the base of the rose bush, but transport the soil in. An alternative method is to create a cylinder of tarpaper or wire mesh placed around the bush and filled with straw. For climbing roses, remove canes from their support system. Lay canes on the ground and cover with an 8 to 10 inch layer of soil. You can also wrap canes in burlap and anchor canes parallel to the ground.

The time to remove most of the winter mulch is when the forsythia starts to bloom. Remove remaining mulch as the maple trees start to bud. By gradually removing the mulch less damage occurs to the plants. Abnormal growth appears when mulches are left too long after new growth has begun and removal of mulch too early invites cold and wind damage to exposed crowns.

When planning a herbaceous perennial border choose plant material suitable for the area and pay close attention to the zone hardiness for each plant. Flower species planted in one zone colder than specified may survive if special care is given to winter protection. Fall planted perennials must be protected with a thicker than normal layer of mulch for the first winter.

There is still time for applying winter mulches to herbaceous perennials to prevent early spring damage. By protecting plants and choosing suitable plant species for your zone less time and money will be spent in the spring replacing winter damaged plants.

Control of Annual Bluegrass in Golf Tees using Perennial Ryegass and Ethofumesate

David K. Bell
Former Graduate Research Assistant
Department of Plant and Soil Science, University of Massachusetts/Amherst

The debate continues on whether annual bluegrass (Poa annua L.) should be cultured or controlled in sports turf. This decision has to be made on a case by case basis by a turf specialist. Each site and situation is different. Interactions of factors such as soil conditions, amount of moisture, climate, and cultural practices often make it almost impossible to limit annual bluegrass infestations. However, variations of these factors under slightly different circumstances might not favor growth of annual bluegrass as much, making control more practical. Budget limitations and personal preferences of the people paying to maintain the turf often have a decisive role in which course of actions will be pursued. The decision made by University of Massachusetts Researchers was to investigate a management program designed to control annual bluegrass on golf tees.

Annual bluegrass is a cool season turfgrass species native to Europe (1). Characteristics of this grass include light green or yellowish color, bunching growth habit under low maintenance regimes, and an intermediate leaf texture (2, 3). In cool and humid climates annual bluegrass behaves as a summer annual (3). When cultured under certain maintenance regimes, heat and water stress have been shown to affect annual bluegrass more detrimentally than Kentucky bluegrass or creeping bentgrass species (1, 4, 5). Optimum conditions for annual bluegrass growth can often make it a prolific seed producer (2, 15). If environmental conditions are proper for seed determination, infestations of annual bluegrass will occur in voids in the turf caused by divots, traffic, disease, or insects (4).

Numerous chemical treatments have been applied to control annual bluegrass but most with only limited success. Post-emergence applications of inorganic arsenicals have been used on Kentucky bluegrass and bentgrass turfs to control annual bluegrass infestations (11), but these compounds often injured the desirable turf (8, 16). Pre-emergence treatments of bromocil, benefin, DCPA, and triflurolin were shown to effectively control artificially introduced annual bluegrass (10). However, injury to desirable grasses by some of these materials has been reported by investigators (6, 9, 11).

A relatively new herbicide, ethoflumesate, has been shown by many investigators to selectively suppress annual bluegrass in ryegrass (12, 13, 14). This material, made by BFC Chemicals, Inc., has recently been labeled under the trade name 'Prograss' for use on perennial ryegrass.

Studies were conducted by University of Massachusetts researchers to investigate the use of ethofumesate in conjunction with a perennial ryegrass overseeding program to control annual bluegrass in golf tees. The experiments were initiated on the 5th and 9th tees at Amherst Golf Club, Amherst, Massachusetts during August of 1980 and were concluded in August of 1982. In one major respect the study on the 9th tee differed slightly from the experiment conducted on the 5th tee. Overseedings and herbicide treatments carried out on the 9th tee were done on the existing turf which was estimated to be 95% annual bluegrass at the beginning of the study. The objective of this experiment was to convert the annual bluegrass turf stand to perennial ryegrass. In contrast, the 5th tee was sprayed with glyphosate to eradicate any existing grass or weeds one week prior to seeding with perennial ryegrass and ethofumesate treatments. The purpose to this study was to investigate the use of the same overseeding and ethofumesate treatments carried out on the 9th tee to prevent the ingress of annual bluegrass into the ryegrass turf.

Overseeding with perennial ryegrass was carried out on the whole of both tees immediately prior to herbicide treatments (Table 1). Seedings were also conducted at other times during the year when the golf course superintendant deemed necessary.

Table 1: Dates, Coring, Perennial Ryegrass Seed, Rate, Method of Seeding; 9th and 5th tees Amherst Golf club. 1980, 1981, 1982.

Dates	Coring	Perennial Ryegrass Seed	Rate lb/1000ft^2	Method of Seeding
8/28/80*		Manhattan	8	Broadcast
8/28/80**	✓	Manhattan	4	Broadcast
9/24/80		Manhattan	4	Sliced
10/3/80		Blend +	4	Sliced
10/28/80	✓	Blend	3	Broadcast
4/28/81	✓	Blend	3	Broadcast
5/17/81		Blend	3	Sliced
6/15/81		Blend	3	Sliced
8/24/81	✓	Manhattan	4	Broadcast
8/26/81		Blend	3	Sliced
9/10/81		Blend	3	Sliced
9/25/81		Manhattan	3	Sliced
10/8/81	✓	Blend	3	Broadcast
4/22/82		Manhattan	4	Sliced
5/20/82	✓	Manhattan	4	Sliced

* 5th Tee only **9th Tee only
+ Blend = ⅓ Citation, ⅓ Manhattan, ⅓ Omega perennial ryegrass.

Each tee was divided into 3 sections which were subsequently divided into 12 treatment plots. Plot size on the 9th tee was 5 by 10 ft., but they measured 4 by 10 ft. on the 5th tee. Each of the 3 sections of each tee contained 3 pre-emergence, 3 post-emergence, 3 pre and post-emergence, and 3 untreated plots (Table 2), Pre-emergence and post-emergence designations were in reference to the expected time of annual bluegrass seed germination, not the germination of ryegrass which was overseeded.

Table 2: Treatment Time, Rate, % Annual bluegrass on the 9th and 5th tees, 1981 and 1982.

Treatment Time	Rate lb/A	% annual bluegrass# 9th tee 1981	% annual bluegrass 9th tee 1982	% annual bluegrass 5th tee 1981	% annual bluegrass 5th tee 1982
Pre-emergence*	0.75	81	59	24	34
Pre-emergence	1.00	74	55	16	24
Pre-emergence	1.50	57	36	15	12
				11	
Post-emergence**	0.75	52	44	16	12
Post-emergence	1.00	41	30	19	24
Post-emergence	1.50	39	27	16	12
Pre and Post-emergence	0.75+ 1.50	17	11	11	4
Pre and Post-emergence	1.00+ 1.00	15	11	11	5
Pre and Post-emergence	0.75+ 1.50	36	19	17	6
Untreated	0.00	86	72	55	57

#% ryegrass in the turf stand = 100 — % annual bluegrass

*Pre-emergence Treatments were applied on 8/28/80, 4/17/81, 8/26/81, and 4/22/82.

**Post-emergence Treatments were applied on 9/24/80, 5/20/81, 9/25/81, and 5/21/82, four weeks after Pre-emergence treatments.

Each tee received 2.5 to 3.0 lbs. of nitrogen a year, divided among 7 to 8 applications. Mowing was carried out 3 times weekly at a height of 0.75 in. until mid-June when the cutting height was increased to 1.0 in. The 0.75 in. cutting height was resumed in mid-August. Each tee received 5 fungicide treatments in 1980 and 1981. Pesticide treatments other than ethofumesate were not applied in 1982.

Visual estimates of the percent composition of annual bluegrass shoots, and percent perennial ryegrass shoots in the turf canopy were made on each plot. Data was collected and recorded at the end of each month from June-October 1981, and May-August 1982.

The untreated plots on the 9th tee had the greatest percentage of annual bluegrass in the stand (Table 2). These results indicate that overseeding without ethofumesate treatments was not as effective controlling annual bluegrass as overseeding and chemical treatments. Turfgrass on the 5th and 9th tees treated with both pre and post-emergence applications at rates of 0.75 lbs./A followed by 1.5 lbs./A and other turf treated with 1.0 lbs./A followed by 1.0 lbs./A resulted in the lowest percentage of annual bluegrass in the stand during both 1981, and 1982 (Table 2). Grass on the 9th tee that received post-emergence treatments had less annual bluegrass in the stand than did pre-emergence treated turf at the same rates. As rates of ethofumesate, applied either as pre-emergence or post-emergence treatments, increased from 0.75 to 1.5 lbs./A the control of annual bluegrass increased.

Results of these studies indicated that the ryegrass overseeding program in conjunction with ethofumesate treatments controlled annual bluegrass in the golf tees. The advantage of overseeding the existing turf and subsequently applying the herbicide, as was done on the 9th tee, is that the tee does not have to be removed from play for long periods of time. The main disadvantage, however, is that the conversion from annual bluegrass to ryegrass requires many overseedings and is slow.

Eradicating the existing turf and weeds with glyphosate, and completely renovating the tee as was carried out on the 5th tee has the advantage of eliminating all the annual bluegrass at once. Ethofumesate treatments should keep annual bluegrass invasion to the newly planted ryegrass at a minimum. Overseedings of ryegrass should keep the turf stand dense. The disadvantage to this program is that the tee has to be removed from play after renovation until the grass stand is established.

Unfortunately ethofumesate is labeled for use only on ryegrass. Ryegrass has some qualities that are undesirable. One such characteristic is that perennial ryegrass is only marginally winter hardy in the northeast. Another is that ryegrass does not have rhizomes as Kentucky bluegrasses, or stolons as creeping bentgrasses, therefore, in order to maintain a dense stand overseeding is needed when the turf is thinned from wear or environmental factors. Because of the relatively high capital and labor costs of this overseeding and herbicide program, it would not be practical to carry it out on large areas. This program does provide another option to be considered on small areas of intensively used turf such as the tees used for these studies at Amherst Golf Club. The decision on whether or not to try a management program such as this will have to be made by the individual turf specialist after careful evaluation of the annual bluegrass problem, and whether it would be easier and less expensive to maintain annual bluegrass, or perennial ryegrass in the long term.

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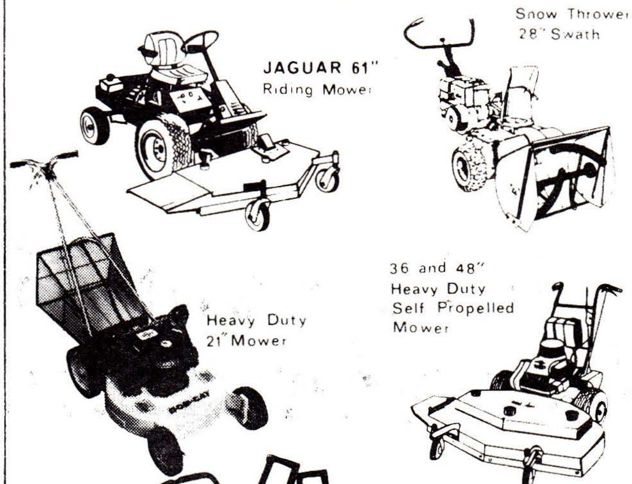
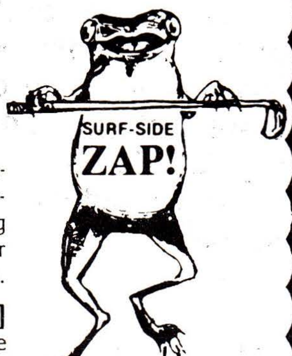
Salt-Tolerance Study

A 9 week salt-tolerance study was conducted on 45 Kentucky bluegrass cultivars at the University of Massachusetts South Deerfield Turf Plots in 1982. Dr. William Torello examined turf quality after increasing concentrations (from 0 to 3% NaCl) of salt solution was applied to the turf. The objectives of the experiment were: 1) to determine which cultivars had the greatest salt-tolerance in the field, and 2) which cultivars have the potential for the development of drought-resistant and salt-tolerant turf.

Little variation in salt-tolerance was found between cultivars tested. 'Majestic', 'Princeton', and 'Galaxy' had the best quality ratings while 'Haga', 'Plush', and 'Victa' were the poorest. The more tolerant cultivars remained higher in quality even after higher salt concentrations were applied. Spray applications caused the color quality of all cultivars to increase during the first 5 week. Color, however, was greenish-blue which can be indicative of drought stress or "physiological" drought stress.

Results of this study indicate that Kentucky bluegrasses are not very salt-tolerant, although variation between cultivars does exist. Field and laboratory research will be continued to better determine the overall level of salt-tolerance within the Kentucky bluegrasses.





Turf Field Day, 1983

Mark it on your calendar! Turf Field Day will be held on Wednesday, June 22 at the University of Massachusetts Turf Research Station in South Deerfield. Last year 250 people from throughout the Northeast attended for a tour of the research station and an explanation of the types of research being conducted. The tour will be followed by a lunch at the top of Mt. Sugarloaf.

FROM

Massachusetts Turf and Lawn Grass Council
Incorporated

RFD 2, Hadley, Mass. 01035

Join Your Massachusetts Turf and Lawn Grass Council

The Massachusetts Turf and Lawn Grass Council is a non-profit corporation. Its officers derive no benefits except the satisfaction of keeping Massachusetts and its neighbors first in turf. It was founded on the principle of "Better Turf Through Research and Education." We must support our University to accomplish this, and we can with a large and strong Turf Council.

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For more information write:

Mass. Turf and Lawn Grass Council
attn.: Dr. Joseph Troll
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